

Novel Smart Pan/Tilt/Zoom Sensor for Launch Range Video Surveillance, Phase II

Completed Technology Project (2010 - 2012)



Project Introduction

NASA has a pressing need for increasing the efficiency of launch range surveillance during mission launch operations. Difficulty in verifying a cleared range causes significant launch delay that may significantly affect the operation safety, cost and schedule. With the increase of workload on existing and/or newly-built spaceports, challenges in launch range clearance and surveillance call for new breakthrough in technologies to better serve for NASA's missions. We propose this SBIR to develop a novel "Smart Pan/Tilt/Zoom Visible/IR Sensor" platform, dubbed Smart PTZ(TM), especially suited for detection, tracking, recognition, and identification of persons and objects that have intruded areas of the range that must be cleared in order to conduct safe launch operations. Conventional optical sensors have limited field of views (FOV). They observe objects through a small solid angle.

Simultaneous acquisition of target in panoramic view is not possible. Although optical amplification may provide detailed target image, detecting and tracking target(s) in a large area is difficult, resulting in lengthy search time, costly UAV maneuvers, low efficiency in verifying range clearance, even missing intruder due to limited FOV. Increasing FOV, however, is a double-edged sword that leads to a decreased spatial resolution, causing difficulties in target recognition and classification. To resolve the simultaneous yet contradicting requirements on the FOV and image resolution for range surveillance applications, we propose a novel Smart PTZ sensor concept that meets both needs with unprecedented performance. By integrating both wide FOV sensor and agile PTZ sensor within a compact package, together with a set of intelligent video analysis algorithms, the Smart PTZ sensor would enable high performance target detection, tracking, recognition and classification, within a very large FOV (up to 360-degree) for NASA launch range clearance and surveillance.



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Sensor for Launch Range Video
Surveillance, Phase II

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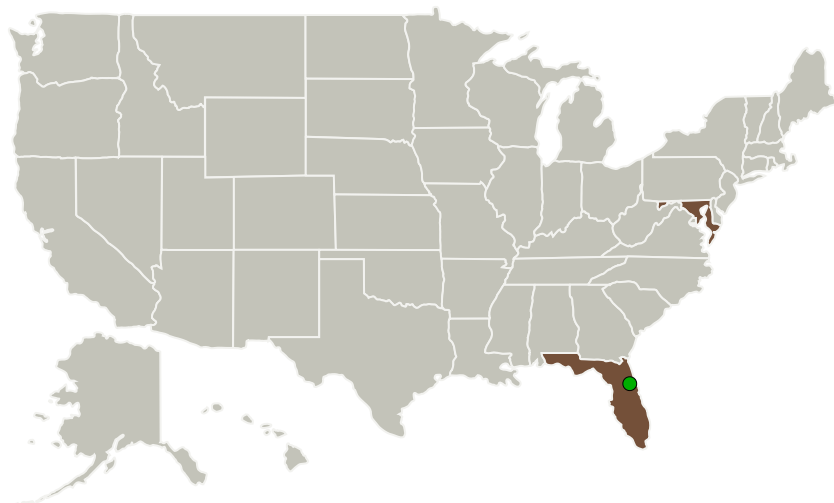
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Xigen, LLC	Lead Organization	Industry	Rockville, Maryland
● Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations	
Florida	Maryland

Project Transitions

January 2010: Project Start

January 2012: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139303>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Xigen, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

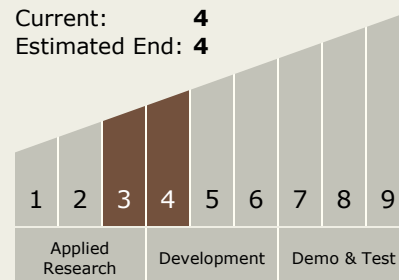
Carlos Torrez

Principal Investigator:

Jason Geng

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
 - └ TX16.5 Range Tracking, Surveillance, and Flight Safety Technologies

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System